NATIONAL TOXICOLOGY PROGRAM
Technical Report Series
No. 424

TOXICOLOGY AND CARCINOGENESIS STUDIES OF *o*-BENZYL-*p*-CHLOROPHENOL

(CAS NO. 120-32-1)

IN F344/N RATS AND B6C3F$_1$ MICE

(GAVAGE STUDIES)

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
National Institutes of Health

FOREWORD

The National Toxicology Program (NTP) is made up of four charter agencies of the U.S. Department of Health and Human Services (DHHS): the National Cancer Institute (NCI), National Institutes of Health; the National Institute of Environmental Health Sciences (NIEHS), National Institutes of Health; the National Center for Toxicological Research (NCTR), Food and Drug Administration; and the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control. In July 1981, the Carcinogenesis Bioassay Testing Program, NCI, was transferred to the NIEHS. The NTP coordinates the relevant programs, staff, and resources from these Public Health Service agencies relating to basic and applied research and to biological assay development and validation.

The NTP develops, evaluates, and disseminates scientific information about potentially toxic and hazardous chemicals. This knowledge is used for protecting the health of the American people and for the primary prevention of disease.

The studies described in this Technical Report were performed under the direction of the NIEHS and were conducted in compliance with NTP laboratory health and safety requirements and must meet or exceed all applicable federal, state, and local health and safety regulations. Animal care and use were in accordance with the Public Health Service Policy on Humane Care and Use of Animals. The prechronic and chronic studies were conducted in compliance with Food and Drug Administration (FDA) Good Laboratory Practice Regulations, and all aspects of the chronic studies were subjected to retrospective quality assurance audits before being presented for public review.

These studies are designed and conducted to characterize and evaluate the toxicologic potential, including carcinogenic activity, of selected chemicals in laboratory animals (usually two species, rats and mice). Chemicals selected for NTP toxicology and carcinogenesis studies are chosen primarily on the bases of human exposure, level of production, and chemical structure. Selection *per se* is not an indicator of a chemical's carcinogenic potential.

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NTP TECHNICAL REPORT

ON THE

TOXICOLOGY AND CARCINOGENESIS

STUDIES OF

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P.O. Box 12233
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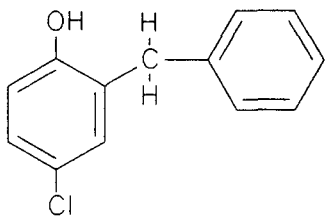
ABSTRACT



o-BENZYL-*p*-CHLOROPHENOL

CAS No. 120-32-1

Chemical Formula: $C_{13}H_{11}ClO$ Molecular Weight: 218.7

Synonyms: 2-benzyl-4-chlorophenol, 4-chloro-2-benzylphenol, 4-chloro-2-(phenylmethyl)phenol, 4-chloro-α-phenol-*o*-cresol, *p*-chloro-*o*-benzylphenol, 2-hydroxy-5-chlorodiphenylmethane

Trade names: Bio-Clave, Chlorophene, Clorofene, Clorophene, Ketolin H, Nipacide BCPR, Preventol BPR, Santophen I, Septiphene

o-Benzyl-*p*-chlorophenol is an aryl halide biocide with widespread use in hospitals and households as a broad-spectrum germicide in disinfectant solutions and soap formulations for general cleaning and disinfecting. Human exposure to *o*-benzyl-*p*-chlorophenol occurs by absorption through the skin and mucous membranes and by ingestion. Toxicity and carcinogenicity studies were conducted by administering *o*-benzyl-*p*-chlorophenol (approximately 97% pure) in corn oil by gavage to male and female F344/N rats and B6C3F$_1$ mice for 16-days, 13-weeks, and 2-years. Clinical pathology parameters were evaluated during the 2-year rat study. Genetic toxicity studies were conducted in *Salmonella typhimurium*, cultured Chinese hamster ovary cells, L5178Y mouse lymphoma cells, and cultured human lymphoblast cells.

16-Day Study in Rats

Groups of five male and five female rats were administered *o*-benzyl-*p*-chlorophenol in corn oil by gavage at doses of 0, 62.5, 125, 250, 500, or 1,000 mg/kg body weight 5 days a week over a 16-day period. Two 1,000 mg/kg female rats died and these deaths were attributed to chemical administration. The mean body weight gains of 1,000 mg/kg males and females were significantly lower than those of the controls. Clinical findings in 1,000 mg/kg males and females included diarrhea and rough hair coat. Absolute and relative kidney and liver weights of 250, 500, and 1,000 mg/kg males and 1,000 mg/kg females were significantly greater than those of the controls. Absolute and relative thymus weights of 500 and 1,000 mg/kg males and 250, 500, and 1,000 mg/kg females were significantly lower than those of the controls. At necropsy, dilatation of the cecum was observed in male and female rats; the incidence generally increased with dose. The dilated cecum of some dosed rats had necrosis of the mucosal epithelium. Mild to moderate nephropathy was observed in all 1,000 mg/kg male and female rats. Minimal nephropathy occurred in one rat receiving 62.5 mg/kg, two rats each from the 125 and 250 mg/kg groups, and seven rats in the 500 mg/kg groups. The incidence and severity of nephropathy increased with dose.

16-Day Study in Mice

Groups of five male and five female mice were administered *o*-benzyl-*p*-chlorophenol in corn oil by gavage at doses of 0, 62.5, 125, 250, 500, or 1,000 mg/kg body weight 5 days a week over a 16-day

period. Deaths occurred only in the 1,000 mg/kg groups, in which three males and all females died. Mean body weight gains of dosed male and female mice were generally similar to those of the controls. Clinical findings in male and female high-dose mice included rough hair coat and postural changes. Absolute and relative liver weights of 500 and 1,000 mg/kg males and 500 mg/kg females (the highest dose group of females surviving) were significantly greater than those of the controls. Necropsy findings included dilatation of the cecum. Nephropathy occurred in 500 and 1,000 mg/kg mice (500 mg/kg, 2/10; 1,000 mg/kg, 6/10).

13-Week Study in Rats

Groups of 10 male and 10 female rats were administered *o*-benzyl-*p*-chlorophenol in corn oil by gavage at doses of 0, 30, 60, 120, 240, or 480 mg/kg body weight 5 days a week for 13 weeks. No deaths were attributed to *o*-benzyl-*p*-chlorophenol administration; however, the deaths of five male rats were attributed to gavage trauma. Mean body weight gains of all dosed rats were generally similar to those of the controls. Clinical findings included yellow-red staining of the urogenital region hair coat of all dosed females. The albumin/globulin ratios in 120, 240, and 480 mg/kg male rats increased with dose and were the result of net decreases in total globulin. Administration of *o*-benzyl-*p*-chlorophenol caused no significant alterations in hematologic or urinalysis parameters. Absolute and relative kidney weights were significantly greater and the absolute and relative thymus weights were significantly lower in 480 mg/kg male and female rats and in 240 mg/kg female rats. No gross lesions related to compound administration were observed at necropsy. Nephropathy of mild to moderate severity occurred in 480 mg/kg male and female rats and in 240 mg/kg male rats. Few or no lesions occurred in other dosed rats and none occurred in controls.

13-Week Studies in Mice

In the first 13-week study, groups of 10 male and 10 female mice were administered *o*-benzyl-*p*-chlorophenol in corn oil by gavage at doses of 0, 30, 60, 120, 240, or 480 mg/kg body weight 5 days a week for 13 weeks. Survival, mean body weight gains, and clinical findings of dosed animals were similar to those of the controls throughout the study. The Pathology Working Group confirmed that no microscopic lesions were observed that could definitively be associated with *o*-benzyl-*p*-chlorophenol administration. On the basis of these findings, a second 13-week study was performed using higher doses.

In the second 13-week study, groups of 15 male and 15 female mice were administered *o*-benzyl-*p*-chlorophenol in corn oil by gavage at doses of 0, 500, 650, 800, or 1,000 mg/kg body weight 5 days a week for up to 13 weeks. Five male and five female mice from each group were evaluated after 2 weeks, with the remainder (up to 10 per sex) evaluated at the end of the study. One 500 mg/kg mouse, three 650 mg/kg mice, 14 mice receiving 800 mg/kg, and 19 mice administered 1,000 mg/kg died before the end of the study. Mean body weight gains of dosed male and female mice that received 500 or 800 mg/kg were lower than those of the controls. Absolute and relative liver weights of 800 mg/kg males and all surviving dosed females were significantly greater than those of the controls. Absolute and relative kidney weights of 500, 650, and 800 mg/kg male mice were slightly lower than those of the controls, and those of female mice were similar to those of the controls. The incidence and severity of nephropathy increased with time and with increasing dose of *o*-benzyl-*p*-chlorophenol. Significant nephropathy was present at all doses, with mild nephropathy present at the 500 mg/kg dose. Acute necrotizing, suppurative inflammation of the olfactory epithelium was noted in all dose groups, with severity increasing with dose. These lesions were considered to be directly related to the caustic nature of *o*-benzyl-*p*-chlorophenol following retrograde exposure after gavage, with the presence of foreign material likely due to retrograde migration of the chemical.

2-Year Study in Rats

Groups of 80 male and 80 female rats were administered *o*-benzyl-*p*-chlorophenol in corn oil by gavage 5 days a week for 103 weeks. The doses were 0, 30, 60, or 120 mg/kg body weight for male rats and 0, 60, 120, or 240 mg/kg body weight for female rats. After 3 and 15 months, 7 to 10 male and 8 to 10 female rats were evaluated for organ weights and clinical pathology, and control and high-dose rats were evaluated for histopathology.

Survival, Body Weights, and Clinical Findings
Survival of dosed male and female rats was similar to that of the controls. Mean body weights of dosed rats were generally similar to those of the controls. No chemical-related clinical findings were observed except yellow staining of the urogenital area hair coat in dosed female rats; staining was observed earlier in high-dose female rats.

Pathology Findings
Severe, time- and dose-related nephropathy was observed in male and female rats, occurring as early as 3 months after the beginning of chemical administration (females). In male rats dosed for as long as 2 years, secondary hyperparathyroidism developed, with parathyroid gland hyperplasia, mineralization of the kidney and glandular stomach, and fibrous osteodystrophy occurring in the high-dose group. The severity of these lesions was greater in males. The kidney was the only organ in which chemical-related increased incidences of neoplasms may have occurred. One renal tubule adenoma occurred in a control male rat, one renal tubule adenoma and one transitional cell carcinoma occurred in high-dose female rats, and one transitional cell carcinoma occurred in a mid-dose female. One renal tubule carcinoma was observed in a high-dose male rat.

2-Year Study in Mice

Groups of 70 male and 70 female mice were administered *o*-benzyl-*p*-chlorophenol in corn oil by gavage at doses of 0, 120, 240, or 480 mg/kg body weight 5 days a week for 103 weeks. Ten male and 9 or 10 female mice were evaluated after 3 and 15 months for organ weights and histopathology; the remaining 50 male and 50 female mice were evaluated at the end of the study.

Survival, Body Weights, and Clinical Findings
Survival of high-dose male and female mice was lower than that of the controls, which was associated in part with dose-related increases in the incidence and severity of nephropathy. The final mean body weights of all dosed males and mid- and high-dose females were lower than those of the controls. Chemical-related clinical findings included emaciation, abnormal posture, rough hair coat, and hypoactivity.

Pathology Findings
Nephropathy occurred in most dosed males and females, and the incidence and severity increased with time and dose. Fibrous osteodystrophy of bone, mineralization of the glandular stomach, and squamous hyperplasia of the forestomach occurred in male and female mice. In the standard evaluation, the combined incidence of renal tubule adenoma and carcinoma was increased in 240 mg/kg male mice. Six renal tubule adenomas and three renal tubule carcinomas occurred in dosed male mice. No renal neoplasms occurred in female mice.

Due to the marginal increase in renal neoplasia, and the small size of renal neoplasms, an extended evaluation of the kidney was conducted. No significant alteration in the neoplasm incidences were observed in female mice. However, a dose-related increased trend of renal tubule adenoma was observed in male mice. Combination of the extended evaluation with the original evaluation resulted in an increased incidence of renal tubule adenomas in the 480 mg/kg males and an increased incidence of renal tubule adenomas or carcinomas in both the 240 and 480 mg/kg males.

Genetic Toxicology

o-Benzyl-*p*-chlorophenol did not induce gene mutations in *Salmonella typhimurium* strains TA98, TA100, TA1535, or TA1537 and did not induce sister chromatid exchanges or chromosomal aberrations in cultured Chinese hamster ovary cells. These tests were performed with and without exogenous metabolic activation (S9). Positive results were obtained, however, in gene mutation tests conducted with L5178Y mouse lymphoma cells and TK6 human lymphoblast cells in the absence of S9.

CONCLUSIONS

Under the conditions of these 2-year gavage studies, there was *no evidence of carcinogenic activity** of *o*-benzyl-*p*-chlorophenol in male F344/N rats receiving 30, 60, or 120 mg/kg body weight. There was *equivocal evidence of carcinogenic activity* of *o*-benzyl-*p*-chlorophenol in female F344/N rats based on the occurrence of two rare renal transitional cell carcinomas. There was *some evidence of carcinogenic activity* of *o*-benzyl-*p*-chlorophenol in male B6C3F$_1$ mice based on increased incidences of renal tubule adenoma and renal tubule adenoma or carcinoma (combined). There was *no evidence of carcinogenic activity* of *o*-benzyl-*p*-chlorophenol in female B6C3F$_1$ mice receiving 120, 240, or 480 mg/kg.

o-Benzyl-*p*-chlorophenol was nephrotoxic for male and female F344/N rats and B6C3F$_1$ mice. The severity of nephropathy was increased in male and female rats and the incidence and severity of nephropathy was increased in male and female mice. The incidence and severity of nephropathy increased with length of treatment. Other lesions considered to be associated with the nephropathy and the secondary hyperparathyroidism in male rats and in male and female mice included fibrous osteodystrophy and soft tissue mineralization. Increased incidences of squamous cell hyperplasia of the forestomach were observed in mice.

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* Explanation of Levels of Evidence of Carcinogenic Activity is on page 11. A summary of the Technical Reports Review Subcommittee comments and the public discussion on this Technical Report appears on page 13.

Summary of the 2-Year Carcinogenesis and Genetic Toxicology Studies of *o*-Benzyl-*p*-Chlorophenol

Male F344/N Rats	Female F344/N Rats	Male B6C3F$_1$ Mice	Female B6C3F$_1$ Mice
Doses			
0, 30, 60, or 120 mg/kg body weight in corn oil by gavage	0, 60, 120, or 240 mg/kg body weight in corn oil by gavage	0, 120, 240, or 480 mg/kg body weight in corn oil by gavage	0, 120, 240, or 480 mg/kg body weight in corn oil by gavage
Body weights			
Dosed groups similar to controls	Dosed groups similar to controls	Dosed groups lower than controls	Mid- and high-dose groups lower than controls
2-Year survival rates			
23/48, 24/48, 25/45, 24/46	26/48, 30/49, 28/50, 28/49	45/50, 32/48, 38/50, 30/48	36/50, 40/47, 33/48, 25/51
Nonneoplastic effects			
Kidney: nephropathy (48/50, 48/49, 48/50, 50/50; severity: 2.4, 2.8, 3.0, 3.3); Parathyroid gland: hyperplasia (0/47, 2/47, 5/45, 8/46); Bone: cranial fibrous osteodystrophy (0/50, 0/50, 2/50, 4/51) femur fibrous osteodystrophy (0/50, 0/50, 2/50, 6/51); Glandular stomach: mineralization (2/49, 4/49, 2/49, 9/50)	Kidney: nephropathy (46/50, 47/50, 50/51, 50/50; severity: 1.3, 1.3, 1.5, 2.4)	Kidney: nephropathy (39/50, 48/50, 50/50, 49/50; severity: 1.1, 2.1, 2.4, 2.5); Bone: fibrous osteodystrophy (0/50, 16/50, 25/50, 28/50); Glandular stomach: mineralization (2/50, 6/50, 12/50, 6/50) Forestomach: squamous hyperplasia (4/50, 12/50, 11/50, 9/50)	Kidney: nephropathy (19/50, 38/50, 48/50, 50/52; severity: 1.0, 1.5, 1.9, 2.3); Bone: fibrous osteodystrophy (2/50, 20/50, 33/50, 37/52); Glandular stomach: mineralization (1/50, 6/50, 10/50, 16/52) Forestomach: squamous hyperplasia (3/50, 10/50, 18/50, 20/52)
Neoplastic effects			
None	None	Kidney (standard evaluation): renal tubule adenoma (0/50, 2/50, 2/50, 2/50) renal tubule adenoma or carcinoma (combined) (0/50, 2/50, 4/50, 3/50); Kidney (standard + extended evaluation): renal tubule adenoma (0/50, 2/50, 4/50, 5/50) renal tubule adenoma or carcinoma (combined) (0/50, 2/50, 6/50, 6/50)	None
Uncertain findings			
None	Kidney: transitional cell carcinoma (0/50, 0/50, 1/51, 1/50)	None	None
Level of evidence of carcinogenic activity			
No evidence	Equivocal evidence	Some evidence	No evidence

Summary of the 2-Year Carcinogenesis and Genetic Toxicology Studies of *o*-Benzyl-*p*-Chlorophenol
(continued)

Genetic toxicology	
Salmonella typhimurium gene mutation:	Negative in strains TA98, TA100, TA1535, and TA1537 with and without S9
Mouse lymphoma gene mutation:	Positive without S9
Human lymphoblast gene mutation:	Positive without S9
Sister chromatid exchanges	
Chinese hamster ovary cells *in vitro*:	Negative with and without S9
Chromosomal aberrations	
Chinese hamster ovary cells *in vitro*:	Negative with and without S9

EXPLANATION OF LEVELS OF EVIDENCE OF CARCINOGENIC ACTIVITY

The National Toxicology Program describes the results of individual experiments on a chemical agent and notes the strength of the evidence for conclusions regarding each study. Negative results, in which the study animals do not have a greater incidence of neoplasia than control animals, do not necessarily mean that a chemical is not a carcinogen, inasmuch as the experiments are conducted under a limited set of conditions. Positive results demonstrate that a chemical is carcinogenic for laboratory animals under the conditions of the study and indicate that exposure to the chemical has the potential for hazard to humans. Other organizations, such as the International Agency for Research on Cancer, assign a strength of evidence for conclusions based on an examination of all available evidence, including animal studies such as those conducted by the NTP, epidemiologic studies, and estimates of exposure. Thus, the actual determination of risk to humans from chemicals found to be carcinogenic in laboratory animals requires a wider analysis that extends beyond the purview of these studies.

Five categories of evidence of carcinogenic activity are used in the Technical Report series to summarize the strength of the evidence observed in each experiment: two categories for positive results (**clear evidence** and **some evidence**); one category for uncertain findings (**equivocal evidence**); one category for no observable effects (**no evidence**); and one category for experiments that cannot be evaluated because of major flaws (**inadequate study**). These categories of interpretative conclusions were first adopted in June 1983 and then revised in March 1986 for use in the Technical Report series to incorporate more specifically the concept of actual weight of evidence of carcinogenic activity. For each separate experiment (male rats, female rats, male mice, female mice), one of the following five categories is selected to describe the findings. These categories refer to the strength of the experimental evidence and not to potency or mechanism.

- **Clear evidence** of carcinogenic activity is demonstrated by studies that are interpreted as showing a dose-related (i) increase of malignant neoplasms, (ii) increase of a combination of malignant and benign neoplasms, or (iii) marked increase of benign neoplasms if there is an indication from this or other studies of the ability of such tumors to progress to malignancy.
- **Some evidence** of carcinogenic activity is demonstrated by studies that are interpreted as showing a chemical-related increased incidence of neoplasms (malignant, benign, or combined) in which the strength of the response is less than that required for clear evidence.
- **Equivocal evidence** of carcinogenic activity is demonstrated by studies that are interpreted as showing a marginal increase of neoplasms that may be chemical related.
- **No evidence** of carcinogenic activity is demonstrated by studies that are interpreted as showing no chemical-related increases in malignant or benign neoplasms.
- **Inadequate study** of carcinogenic activity is demonstrated by studies that, because of major qualitative or quantitative limitations, cannot be interpreted as valid for showing either the presence or absence of carcinogenic activity.

When a conclusion statement for a particular experiment is selected, consideration must be given to key factors that would extend the actual boundary of an individual category of evidence. Such consideration should allow for incorporation of scientific experience and current understanding of long-term carcinogenesis studies in laboratory animals, especially for those evaluations that may be on the borderline between two adjacent levels. These considerations should include:

- adequacy of the experimental design and conduct;
- occurrence of common versus uncommon neoplasia;
- progression (or lack thereof) from benign to malignant neoplasia as well as from preneoplastic to neoplastic lesions;
- some benign neoplasms have the capacity to regress but others (of the same morphologic type) progress. At present, it is impossible to identify the difference. Therefore, where progression is known to be a possibility, the most prudent course is to assume that benign neoplasms of those types have the potential to become malignant;
- combining benign and malignant tumor incidence known or thought to represent stages of progression in the same organ or tissue;
- latency in tumor induction;
- multiplicity in site-specific neoplasia;
- metastases;
- supporting information from proliferative lesions (hyperplasia) in the same site of neoplasia or in other experiments (same lesion in another sex or species);
- presence or absence of dose relationships;
- statistical significance of the observed tumor increase;
- concurrent control tumor incidence as well as the historical control rate and variability for a specific neoplasm;
- survival-adjusted analyses and false positive or false negative concerns;
- structure-activity correlations; and
- in some cases, genetic toxicology.

NATIONAL TOXICOLOGY PROGRAM BOARD OF SCIENTIFIC COUNSELORS
TECHNICAL REPORTS REVIEW SUBCOMMITTEE

The members of the Technical Reports Review Subcommittee who evaluated the draft NTP Technical Report on *o*-benzyl-*p*-chlorophenol on December 1, 1992, are listed below. Subcommittee members serve as independent scientists, not as representatives of any institution, company, or governmental agency. In this capacity, subcommittee members have five major responsibilities in reviewing NTP studies:

- to ascertain that all relevant literature data have been adequately cited and interpreted,
- to determine if the design and conditions of the NTP studies were appropriate,
- to ensure that the Technical Report presents the experimental results and conclusions fully and clearly,
- to judge the significance of the experimental results by scientific criteria, and
- to assess the evaluation of the evidence of carcinogenic activity and other observed toxic responses.

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SUMMARY OF TECHNICAL REPORTS REVIEW SUBCOMMITTEE COMMENTS

On December 1, 1992, the draft Technical Report on the toxicology and carcinogenesis studies of *o*-benzyl-*p*-chlorophenol received public review by the National Toxicology Program Board of Scientific Counselors Technical Reports Review Subcommittee. The review meeting was held at the National Institute of Environmental Health Sciences, Research Triangle Park, NC.

Dr. D.S. Marsman, NIEHS, introduced the studies by discussing the uses of the chemical and rationale of the study, describing the experimental design, reporting on survival and body weight effects, and discussing compound-related neoplasms in female rats and male mice and nonneoplastic lesions in male and female rats and mice. The kidney was the primary target organ for toxicity in both species. Additional step-sections of the kidney were performed in male and female rats and mice. The proposed conclusions were *no evidence of carcinogenic activity* in male F344/N rats, *equivocal evidence of carcinogenic activity* in female F344/N rats, *some evidence of carcinogenic activity* in male $B6C3F_1$ mice, and *no evidence of carcinogenic activity* in female $B6C3F_1$ mice.

Mr. Beliczky, a principal reviewer, agreed with the proposed conclusions. He questioned whether the testing conducted satisfied concerns regarding consumer safety in household or hospital use. Mr. Beliczky asked if NIOSH could provide data for inclusion on the method of production and encountered health risks. Dr. J. Haartz, NIOSH, said the data cited from the National Occupational Exposure Survey (NOES) reflect potential exposure and not the actual number of workers exposed.

Dr. van Zwieten, the second principal reviewer, agreed with the proposed conclusions. He said that since the rationale for the study included the relationship of the chemical to a known neurotoxin, extra attention should have been given to morphological assessment of the central and peripheral nervous systems. He added that detailed procedures for neurobehavioral testing should be provided. Dr. Marsman said the NTP standard neurobehavioral battery was used and more details would be included. He said had there been any indication that the chemical was a neurotoxin as is hexachlorophene, additional pathology would have been included in the design.

Dr. Ward, the third principal reviewer, agreed with the proposed conclusions in principle. He thought the dose-related increased incidence of renal tubule adenoma or carcinoma (combined) could support *clear evidence of carcinogenic activity* in male mice. He suggested that a sentence be added to the conclusions about the hyperplastic lesions of the forestomach of mice. Dr. Marsman said that the severity of the hyperplasia did not increase in treated animals and was consistent with that observed with chemicals known to be irritants and administered by gavage. Dr. Ward noted that though there was no depression of weight gain in rats, the renal lesions were severe enough to indicate that a maximum tolerated dose was reached.

Mr. Beliczky moved that the technical report on *o*-benzyl-*p*-chlorophenol be accepted with the revisions discussed and the conclusions as written: for male rats and female mice, *no evidence of carcinogenic activity*; for female rats, *equivocal evidence of carcinogenic activity*; and for male mice, *some evidence of carcinogenic activity*. Dr. van Zwieten seconded the motion, which was accepted unanimously with 10 votes.